

Frequency Mixer WIDE BAND

Level 10 (LO Power +10 dBm) 1700 to 8000 MHz

SIM-83LH+



Generic photo used for illustration purposes only

CASE STYLE: HV1195

Maximum Ratings

Operating Temperature -40°C to 85°C

Storage Temperature -55°C to 100°C

RF Power 50mW

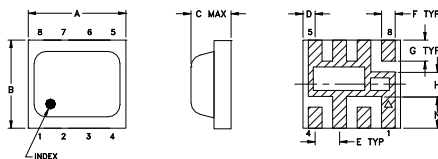
For extended temperature range, consult factory.

Permanent damage may occur if any of these limits are exceeded.

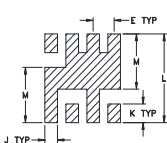
Pin Connections

LO	8
RF	4
IF	2
GROUND	1,3,5,6,7

Outline Drawing



PCB Metal Land Pattern

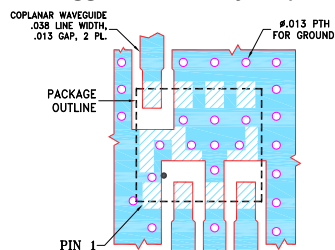


Suggested Layout, Tolerance to be within ±.002

Outline Dimensions (inch)

A	B	C	D	E	F	G
.200	.180	.087	.025	.050	.028	.043
5.08	4.57	2.2098	0.64	1.27	0.71	1.09
H	J	K	L	M	N	wt
.050	.030	.043	.204	.127	0.065	grams
1.27	0.76	1.09	5.18	3.23	1.65	0.08

Demo Board MCL P/N: TB-382 Suggested PCB Layout (PL-239)



NOTES:

1. TRACE WIDTH AND GAP ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ±.0015"; COPPER: 1/2 OZ. EACH SIDE.
FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.

2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

COPLANAR WAVEGUIDE
.038 LINE WIDTH,
.013 GAP, 2 PL.

PACKAGE OUTLINE

PIN 1

#.013 PTH FOR GROUND

COPLANAR WAVEGUIDE
.038 LINE WIDTH,
.013 GAP, 2 PL.

PACKAGE OUTLINE

PIN 1

#.013 PTH FOR GROUND

COPLANAR WAVEGUIDE
.038 LINE WIDTH,
.013 GAP, 2 PL.

PACKAGE OUTLINE

PIN 1

#.013 PTH FOR GROUND

COPLANAR WAVEGUIDE
.038 LINE WIDTH,
.013 GAP, 2 PL.

PACKAGE OUTLINE

PIN 1

Features

- wide bandwidth, 1700 to 8000 MHz
- low conversion loss, 6.0 dB typ.
- excellent IF BW, DC to 3000 MHz
- LTCC double balanced mixer
- tiny size, low profile, 0.08"
- useable as up and down converter
- aqueous washable
- protected by US patent 7,027,795

Applications

- satellite up and down converters
- defense radar and communications
- line of sight links
- WIFI
- blue tooth
- VSAT
- ISM

Electrical Specifications

FREQUENCY (MHz)	CONVERSION LOSS* (dB)			LO-RF ISOLATION (dB)		LO-IF ISOLATION (dB)		IP3 at center band (dBm)
	Typ.	σ	Max.	Typ.	Min.	Typ.	Min.	
LO/RF f _L -f _U	IF							Typ.
1700-8000	DC-3000							10
1700-3200	6.0	0.1	7.9	33	25	23	17	15
3200-3700	5.7	0.1	6.7	30	24	23	18	18
3700-4200	5.8	0.1	7.2	31	24	28	18	18
4200-8000	6.0	0.2	8.9	23	16	18	8	11

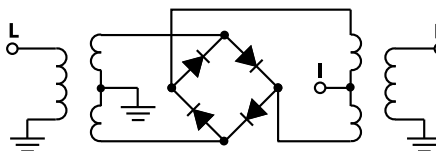
1 dB Compression: +3 dBm typ.

* Conversion loss at 30 MHz IF σ is a measure of repeatability from unit to unit.

Typical Performance Data

Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF Port (:1)	VSWR LO Port (:1)
RF	LO					
		LO +10dBm	LO +10dBm	LO +10dBm	LO +10dBm	LO +10dBm
1700.00	1731.00	6.53	33.97	21.16	1.75	10.50
1800.00	1831.00	6.50	32.41	21.09	1.66	10.19
2000.00	2031.00	6.59	30.98	22.21	1.89	4.97
2300.00	2331.00	6.20	33.66	20.60	2.13	3.59
2600.00	2631.00	5.93	39.44	22.21	2.66	2.64
3000.00	3031.00	5.53	30.63	25.11	2.49	2.45
3400.00	3431.00	5.67	29.29	23.49	2.27	2.21
3800.00	3831.00	5.86	29.82	27.10	2.11	2.66
4200.00	4231.00	6.03	30.69	28.64	2.91	3.30
4600.00	4631.00	6.09	29.09	16.45	2.43	3.74
5000.00	5031.00	6.31	27.35	15.06	3.42	2.77
5400.00	5431.00	5.72	25.94	19.10	2.68	3.51
5800.00	5831.00	5.46	22.31	22.64	2.03	3.08
6200.00	6231.00	5.18	20.81	32.72	1.29	1.91
6600.00	6631.00	5.35	21.56	25.01	1.33	1.26
7000.00	7031.00	5.49	21.93	27.31	1.36	1.68
7400.00	7431.00	5.77	22.35	17.70	1.65	2.26
7700.00	7731.00	6.35	23.66	15.04	2.10	2.86
7900.00	7931.00	7.18	25.31	12.78	2.24	3.29
8000.00	8031.00	8.25	26.35	11.07	2.55	3.12

Electrical Schematic



Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

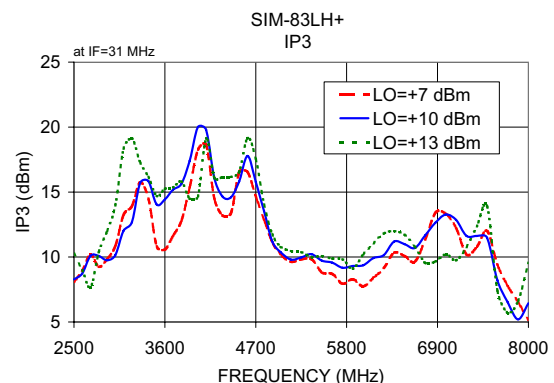
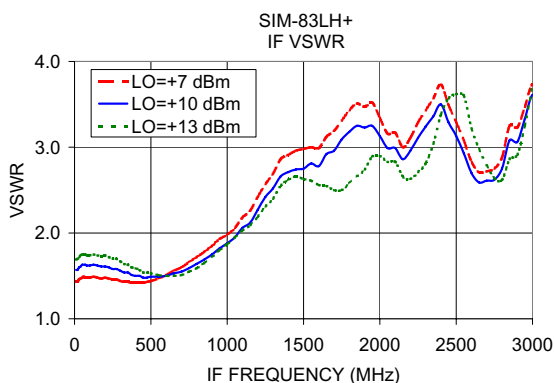
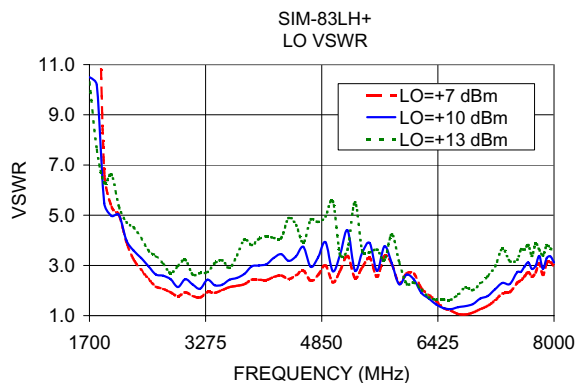
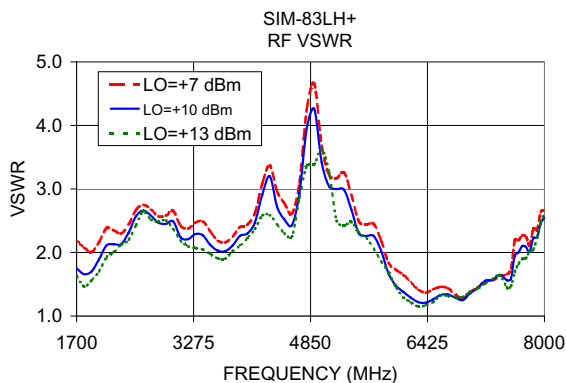
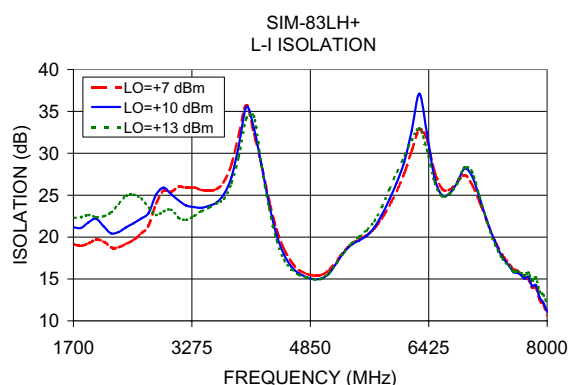
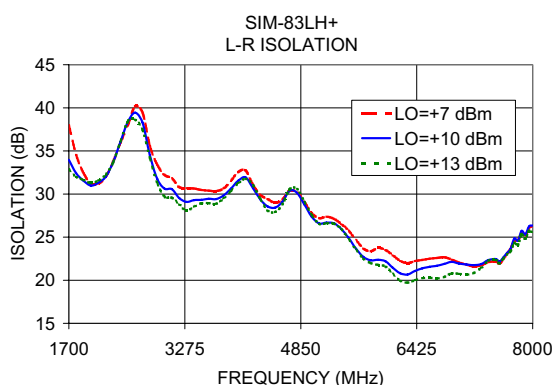
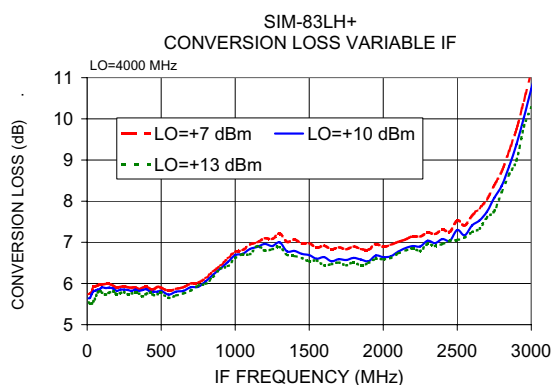
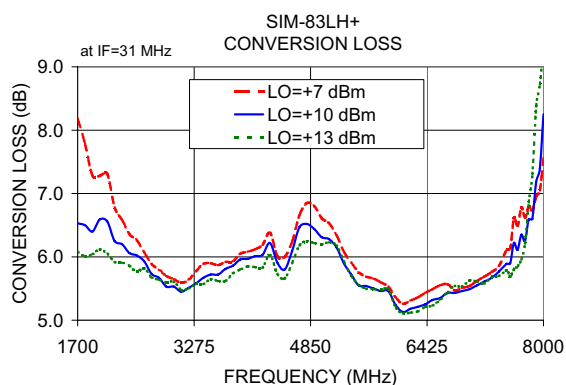
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp



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REV. B
ECO-000060
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Notes

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Frequency Mixer

SIM-83LH+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+7	+10	+13
1500.1	1530.1	11.57	8.10	7.40
1680.1	1710.1	8.77	6.80	6.30
1860.1	1890.1	7.97	6.70	6.33
2040.1	2070.1	7.53	6.77	6.37
2220.1	2250.1	6.74	6.27	6.03
2400.1	2430.1	6.52	6.23	6.09
2580.1	2610.1	6.56	6.44	6.36
2760.1	2790.1	6.29	6.16	6.11
2940.1	2970.1	6.24	6.13	6.11
3120.1	3150.1	6.20	6.05	6.01
3300.1	3330.1	6.21	6.07	6.04
3480.1	3510.1	6.25	6.06	6.01
3660.1	3690.1	6.05	5.93	5.90
3840.1	3870.1	6.05	5.95	5.92
4020.1	4050.1	6.01	5.90	5.86
4200.1	4230.1	5.95	5.81	5.74
4380.1	4410.1	5.75	5.64	5.61
4560.1	4590.1	5.59	5.47	5.43
4720.1	4750.1	5.83	5.69	5.63
4900.1	4930.1	6.14	5.84	5.67
5060.1	5090.1	6.20	5.87	5.65
5240.1	5270.1	6.00	5.78	5.63
5400.1	5430.1	5.65	5.47	5.39
5580.1	5610.1	5.42	5.25	5.21
5740.1	5770.1	5.46	5.28	5.22
5920.1	5950.1	5.44	5.35	5.39
6080.1	6110.1	5.26	5.16	5.22
6260.1	6290.1	5.35	5.24	5.30
6420.1	6450.1	5.46	5.32	5.35
6600.1	6630.1	5.60	5.39	5.37
6760.1	6790.1	5.55	5.41	5.42
6940.1	6970.1	5.40	5.37	5.43
7100.1	7130.1	5.65	5.59	5.64
7280.1	7310.1	5.57	5.51	5.60
7440.1	7470.1	5.65	5.59	5.68
7620.1	7650.1	5.94	5.69	5.65
7780.1	7810.1	6.35	5.99	6.01
7960.1	7990.1	6.58	6.45	7.07
8120.1	8150.1	7.24	7.50	8.50
8300.1	8330.1	9.88	9.92	10.28

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+7	+10	+13
1500.1	1530.1	1.81	8.25	12.11
1680.1	1710.1	2.39	5.07	13.24
1860.1	1890.1	3.92	13.72	15.00
2040.1	2070.1	9.20	12.94	12.48
2220.1	2250.1	10.87	11.95	10.69
2400.1	2430.1	10.28	10.40	9.05
2580.1	2610.1	9.34	8.99	8.28
2760.1	2790.1	10.76	10.98	10.17
2940.1	2970.1	10.97	10.82	10.71
3120.1	3150.1	16.71	14.91	13.70
3300.1	3330.1	15.44	16.46	16.12
3480.1	3510.1	12.33	14.59	19.12
3660.1	3690.1	12.42	16.17	21.48
3840.1	3870.1	16.53	19.50	22.60
4020.1	4050.1	19.52	20.94	19.70
4200.1	4230.1	13.28	14.04	13.84
4380.1	4410.1	13.18	14.84	15.79
4560.1	4590.1	14.45	14.62	14.91
4720.1	4750.1	14.65	15.53	16.26
4900.1	4930.1	11.65	11.09	10.91
5060.1	5090.1	9.32	9.48	10.29
5240.1	5270.1	9.61	9.60	9.50
5400.1	5430.1	9.04	9.37	9.18
5580.1	5610.1	8.59	9.51	9.52
5740.1	5770.1	8.12	9.36	9.48
5920.1	5950.1	8.06	9.17	9.19
6080.1	6110.1	8.78	10.34	11.25
6260.1	6290.1	9.95	10.96	12.16
6420.1	6450.1	11.23	11.67	12.54
6600.1	6630.1	10.83	11.43	11.70
6760.1	6790.1	11.59	12.69	12.05
6940.1	6970.1	14.96	14.81	12.00
7100.1	7130.1	12.49	13.13	11.56
7280.1	7310.1	11.36	13.69	13.61
7440.1	7470.1	12.23	12.77	14.58
7620.1	7650.1	11.46	11.56	9.64
7780.1	7810.1	9.19	7.43	6.54
7960.1	7990.1	6.88	5.75	6.92
8120.1	8150.1	5.35	7.25	10.18
8300.1	8330.1	13.47	13.87	13.18

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+3dBm (dB)		
		@LO (dBm)		
		+7	+10	+13
1500.1	1530.1	2.09	2.76	2.30
1680.1	1710.1	3.45	2.84	1.96
1860.1	1890.1	3.06	2.64	2.13
2040.1	2070.1	2.59	2.27	2.00
2220.1	2250.1	2.58	2.26	1.97
2400.1	2430.1	2.34	1.99	1.74
2580.1	2610.1	1.84	1.60	1.39
2760.1	2790.1	1.50	1.36	1.28
2940.1	2970.1	1.30	1.12	1.04
3120.1	3150.1	1.03	0.83	0.77
3300.1	3330.1	0.86	0.69	0.57
3480.1	3510.1	0.87	0.64	0.46
3660.1	3690.1	0.74	0.46	0.33
3840.1	3870.1	0.75	0.54	0.41
4020.1	4050.1	1.01	0.75	0.58
4200.1	4230.1	1.28	0.99	0.77
4380.1	4410.1	1.25	1.05	0.91
4560.1	4590.1	1.02	0.78	0.62
4720.1	4750.1	1.41	1.14	0.94
4900.1	4930.1	1.82	1.61	1.38
5060.1	5090.1	1.91	1.70	1.48
5240.1	5270.1	2.12	1.91	1.73
5400.1	5430.1	2.26	2.08	1.89
5580.1	5610.1	2.17	1.97	1.81
5740.1	5770.1	2.04	1.83	1.66
5920.1	5950.1	1.94	1.70	1.55
6080.1	6110.1	1.60	1.43	1.36
6260.1	6290.1	1.41	1.16	1.08
6420.1	6450.1	1.41	1.16	1.07
6600.1	6630.1	1.39	1.27	1.26
6760.1	6790.1	1.54	1.42	1.41
6940.1	6970.1	1.38	1.25	1.35
7100.1	7130.1	1.32	1.23	1.33
7280.1	7310.1	1.09	0.91	0.94
7440.1	7470.1	1.32	1.04	0.92
7620.1	7650.1	1.92	1.88	1.94
7780.1	7810.1	2.42	2.49	2.62
7960.1	7990.1	2.49	2.45	2.14
8120.1	8150.1	2.54	2.11	1.56
8300.1	8330.1	1.87	1.25	1.24

REV. X3

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Frequency Mixer

SIM-83LH+

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=4850MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1690MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=8010.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+10			+10			+10
3289.9	1560.1	10.78	10.1	1700.1	6.94	3710.0	4300.1	10.65
3111.0	1739.0	8.95	110.1	1800.1	6.72	3610.0	4400.1	9.95
2952.0	1898.0	8.44	210.1	1900.1	6.67	3510.0	4500.1	9.27
2773.1	2076.9	7.65	310.1	2000.1	6.75	3410.0	4600.1	8.20
2614.0	2236.0	6.93	410.1	2100.1	6.69	3310.0	4700.1	8.04
2435.1	2414.9	6.16	510.1	2200.1	6.53	3210.0	4800.1	8.01
2276.1	2573.9	5.84	610.1	2300.1	6.23	3110.0	4900.1	8.01
2097.2	2752.8	6.13	710.1	2400.1	6.13	3010.0	5000.1	7.91
1938.2	2911.8	6.47	810.1	2500.1	6.27	2910.0	5100.1	7.80
1759.3	3090.7	7.07	910.1	2600.1	6.32	2810.0	5200.1	7.79
1600.3	3249.7	7.87	1010.1	2700.1	6.35	2710.0	5300.1	7.79
1421.4	3428.6	7.89	1110.1	2800.1	6.53	2610.0	5400.1	7.57
1262.3	3587.7	7.57	1210.1	2900.1	6.68	2510.0	5500.1	7.30
1083.4	3766.6	6.99	1310.1	3000.1	6.70	2410.0	5600.1	7.15
924.4	3925.6	6.38	1410.1	3100.1	6.78	2310.0	5700.1	7.17
745.5	4104.5	5.43	1510.1	3200.1	7.06	2210.0	5800.1	7.34
586.5	4263.5	5.28	1610.1	3300.1	7.13	2110.0	5900.1	7.44
407.6	4442.4	5.56	1710.1	3400.1	7.05	2010.0	6000.1	7.54
248.5	4601.5	5.77	1810.1	3500.1	6.94	1910.0	6100.1	7.51
69.6	4780.4	5.76	1910.1	3600.1	6.84	1810.0	6200.1	7.43
90.5	4940.5	5.88	2010.1	3700.1	6.97	1730.0	6280.1	7.31
271.6	5121.6	6.07	2110.1	3800.1	6.81	1630.0	6380.1	7.06
432.5	5282.5	6.37	2210.1	3900.1	6.70	1550.0	6460.1	7.03
613.6	5463.6	6.47	2310.1	4000.1	6.74	1450.0	6560.1	6.96
774.6	5624.6	6.37	2410.1	4100.1	6.83	1370.0	6640.1	6.93
955.7	5805.7	6.59	2510.1	4200.1	6.89	1270.0	6740.1	6.78
1116.7	5966.7	6.57	2610.1	4300.1	7.05	1190.0	6820.1	6.57
1297.7	6147.7	6.68	2710.1	4400.1	7.15	1090.0	6920.1	6.54
1458.7	6308.7	6.90	2810.1	4500.1	7.37	1010.0	7000.1	6.39
1639.8	6489.8	7.51	2910.1	4600.1	7.51	910.0	7100.1	6.29
1800.8	6650.8	7.82	3010.1	4700.1	7.55	830.0	7180.1	6.28
1981.9	6831.9	7.63	3110.1	4800.1	7.67	730.0	7280.1	6.16
2142.8	6992.8	7.30	3210.1	4900.1	7.75	650.0	7360.1	6.09
2323.9	7173.9	7.30	3310.1	5000.1	7.81	550.0	7460.1	6.08
2484.9	7334.9	7.10	3410.1	5100.1	7.85	470.0	7540.1	6.06
2666.0	7516.0	7.02	3510.1	5200.1	8.15	370.0	7640.1	5.95
2827.0	7677.0	6.87	3610.1	5300.1	8.63	290.0	7720.1	5.91
3008.0	7858.0	7.11	3710.1	5400.1	9.27	190.0	7820.1	6.01
3169.0	8019.0	8.09	3810.1	5500.1	9.84	110.0	7900.1	6.25
3350.1	8200.1	10.49	3910.1	5600.1	10.40	10.0	8000.1	6.73

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Frequency Mixer

SIM-83LH+

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+7	+10	+13	+7	+10	+13
1530.1	43.76	37.24	35.54	21.83	22.36	23.88
1710.1	40.79	35.34	33.23	19.66	20.85	23.12
1890.1	33.31	31.50	31.36	18.69	20.65	22.75
2070.1	31.22	31.17	31.36	18.59	20.64	22.46
2250.1	33.39	33.60	33.70	19.25	21.35	23.14
2430.1	37.23	36.95	36.78	20.45	22.62	24.31
2610.1	38.83	37.48	36.02	21.78	23.44	23.97
2790.1	33.92	32.74	32.22	22.61	22.87	22.78
2970.1	30.92	29.72	28.61	22.89	22.93	21.92
3150.1	29.70	28.50	27.65	23.50	22.38	21.24
3330.1	29.22	28.00	26.94	24.26	23.03	21.77
3510.1	29.53	28.34	27.31	24.26	22.85	21.81
3690.1	30.14	28.92	27.88	25.16	23.86	22.94
3870.1	30.67	29.52	28.65	28.27	26.88	26.02
4050.1	31.52	30.19	29.41	32.82	31.67	31.16
4230.1	29.69	29.19	28.99	32.51	33.23	33.94
4410.1	28.68	28.12	28.00	23.97	23.59	23.39
4590.1	27.15	26.84	26.57	18.37	17.80	17.54
4750.1	27.17	26.91	26.55	15.40	15.04	14.73
4930.1	27.04	26.98	26.78	14.14	14.01	13.78
5090.1	26.10	25.85	25.43	14.36	14.17	13.84
5270.1	25.07	24.87	24.18	15.01	15.08	14.70
5430.1	24.08	23.65	23.10	15.94	15.99	15.83
5610.1	23.27	22.67	22.01	17.13	17.34	17.28
5770.1	22.56	21.68	20.90	18.36	18.77	18.81
5950.1	22.03	20.91	19.74	20.07	20.88	21.13
6110.1	20.96	20.11	18.91	21.74	22.91	23.52
6290.1	20.42	19.07	18.25	24.74	26.51	28.05
6450.1	20.33	19.06	18.38	26.82	29.39	32.33
6630.1	19.85	18.85	18.33	28.10	28.90	29.86
6790.1	19.94	19.07	18.61	29.81	29.76	30.09
6970.1	19.85	19.62	19.17	36.05	34.88	33.85
7130.1	19.31	19.34	18.83	33.32	32.95	31.93
7310.1	19.19	19.17	18.96	24.48	24.08	23.88
7470.1	19.29	19.47	19.43	20.13	19.95	19.97
7650.1	20.14	20.41	20.42	18.32	18.33	18.52
7810.1	20.20	20.77	20.59	16.47	16.67	16.59
7990.1	20.42	20.78	20.39	12.30	12.85	13.25
8150.1	22.18	22.14	21.49	9.60	10.39	10.96
8330.1	22.39	22.13	21.60	8.21	8.45	8.94

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+7	+10	+13
1500.1	1530.1	25.85	33.09	16.47
1679.8	1709.8	18.73	13.94	10.45
1859.6	1889.6	11.99	9.93	9.19
2039.3	2069.3	10.77	10.04	9.72
2219.0	2249.0	11.66	10.98	10.62
2398.8	2428.8	13.65	12.99	12.63
2578.5	2608.5	16.93	16.56	16.24
2758.3	2788.3	18.44	18.19	17.88
2938.0	2968.0	20.11	19.93	20.05
3117.7	3147.7	21.16	20.54	20.01
3297.5	3327.5	20.70	20.32	19.61
3477.2	3507.2	19.31	18.95	18.54
3656.9	3686.9	19.23	18.89	18.54
3836.7	3866.7	19.92	19.80	19.58
4016.4	4046.4	20.21	20.06	19.86
4196.2	4226.2	22.38	22.10	21.87
4375.9	4405.9	25.66	25.16	24.83
4555.6	4585.6	28.35	27.80	27.21
4735.4	4765.4	36.58	36.16	35.89
4915.1	4945.1	30.96	30.73	30.56
5094.8	5124.8	27.58	27.41	27.20
5274.6	5304.6	24.50	24.27	24.15
5434.3	5464.3	23.37	23.22	22.90
5614.1	5644.1	22.63	22.37	22.10
5773.8	5803.8	22.17	22.00	21.80
5953.6	5983.6	21.83	21.64	21.49
6113.3	6143.3	22.55	21.94	21.54
6293.1	6323.1	20.99	20.39	20.12
6452.8	6482.8	22.16	21.26	20.92
6632.6	6662.6	26.36	25.33	24.78
6792.4	6822.4	28.17	27.30	26.65
6972.1	7002.1	33.85	33.77	33.32
7131.9	7161.9	38.16	39.92	44.45
7311.6	7341.6	29.26	28.28	27.94
7471.4	7501.4	25.30	23.53	22.17
7651.1	7681.1	21.48	22.55	24.60
7810.9	7840.9	25.15	26.34	32.40
7990.6	8020.6	27.61	29.76	28.10
8150.4	8180.4	27.54	28.15	24.89
8330.1	8360.1	25.21	24.41	22.94

Frequency Mixer

SIM-83LH+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=8000MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+7	+10	+13		+7	+10	+13		+7	+10	+13
1500.1	1530.1	4.01	2.65	2.41	1530.1	27.59	22.00	18.30	10.0	1.06	1.17	1.52
1679.8	1709.8	2.47	1.91	1.69	1710.1	22.00	14.87	11.24	89.8	1.12	1.20	1.59
1859.6	1889.6	1.89	1.47	1.33	1890.1	11.61	8.27	7.90	169.5	1.19	1.26	1.63
2039.3	2069.3	2.00	1.76	1.61	2070.1	6.13	5.77	6.32	269.3	1.34	1.35	1.64
2219.0	2249.0	2.28	2.09	1.96	2250.1	4.18	4.46	5.17	349.0	1.44	1.43	1.66
2398.8	2428.8	2.70	2.57	2.47	2430.1	3.00	3.48	4.23	448.7	1.61	1.52	1.66
2578.5	2608.5	3.00	2.97	2.92	2610.1	2.38	2.90	3.60	528.5	1.74	1.62	1.71
2758.3	2788.3	3.04	2.96	2.92	2790.1	2.07	2.58	3.23	628.2	1.90	1.73	1.75
2938.0	2968.0	3.06	2.92	2.86	2970.1	2.02	2.48	3.09	708.0	2.04	1.83	1.82
3117.7	3147.7	3.08	2.84	2.69	3150.1	2.04	2.51	3.12	807.7	2.24	1.99	1.90
3297.5	3327.5	2.95	2.73	2.55	3330.1	2.16	2.66	3.29	887.5	2.38	2.10	1.96
3477.2	3507.2	2.56	2.31	2.14	3510.1	2.39	2.88	3.48	987.2	2.61	2.28	2.05
3656.9	3686.9	2.31	2.13	1.99	3690.1	2.37	2.88	3.55	1067.0	2.77	2.41	2.11
3836.7	3866.7	2.36	2.22	2.10	3870.1	2.34	2.96	3.68	1166.7	2.91	2.51	2.13
4016.4	4046.4	2.49	2.34	2.22	4050.1	2.43	3.15	3.95	1246.5	3.05	2.63	2.18
4196.2	4226.2	2.75	2.59	2.47	4230.1	2.49	3.29	4.19	1346.2	3.10	2.65	2.11
4375.9	4405.9	2.56	2.39	2.28	4410.1	2.61	3.47	4.43	1425.9	3.20	2.73	2.17
4555.6	4585.6	2.16	1.98	1.83	4590.1	2.69	3.53	4.46	1525.7	3.24	2.74	2.14
4735.4	4765.4	2.28	2.14	2.02	4750.1	2.63	3.39	4.22	1605.4	3.28	2.77	2.14
4915.1	4945.1	2.85	2.62	2.43	4930.1	2.73	3.41	4.14	1705.1	3.32	2.77	2.11
5094.8	5124.8	2.89	2.68	2.48	5090.1	2.82	3.45	4.22	1784.9	3.50	2.89	2.18
5274.6	5304.6	2.63	2.44	2.29	5270.1	2.82	3.30	3.91	1884.6	3.54	2.90	2.17
5434.3	5464.3	2.39	2.22	2.07	5430.1	2.88	3.23	3.76	1964.4	3.62	2.95	2.20
5614.1	5644.1	2.18	2.01	1.87	5610.1	2.85	3.01	3.42	2064.1	3.58	2.91	2.17
5773.8	5803.8	2.07	1.95	1.85	5770.1	2.68	2.68	2.95	2143.9	3.54	2.88	2.17
5953.6	5983.6	1.85	1.79	1.76	5950.1	2.37	2.26	2.42	2243.6	3.47	2.82	2.18
6113.3	6143.3	1.85	1.71	1.65	6110.1	2.06	1.90	2.00	2323.4	3.41	2.79	2.21
6293.1	6323.1	1.84	1.69	1.63	6290.1	1.65	1.53	1.66	2423.1	3.32	2.72	2.22
6452.8	6482.8	1.87	1.69	1.59	6450.1	1.33	1.31	1.56	2502.9	3.26	2.71	2.28
6632.6	6662.6	1.96	1.80	1.69	6630.1	1.07	1.38	1.74	2602.6	3.13	2.63	2.33
6792.4	6822.4	1.85	1.74	1.68	6790.1	1.25	1.66	2.11	2682.3	3.02	2.58	2.39
6972.1	7002.1	1.74	1.67	1.61	6970.1	1.47	1.98	2.52	2782.1	2.93	2.57	2.49
7131.9	7161.9	1.90	1.85	1.82	7130.1	1.72	2.22	2.78	2861.8	2.90	2.62	2.66
7311.6	7341.6	1.76	1.72	1.71	7310.1	2.07	2.53	3.08	2961.5	2.95	2.74	2.89
7471.4	7501.4	1.66	1.52	1.45	7470.1	2.41	2.81	3.30	3041.3	2.97	2.86	3.14
7651.1	7681.1	1.98	1.80	1.67	7650.1	2.64	2.96	3.40	3141.0	3.07	3.07	3.48
7810.9	7840.9	2.38	2.15	1.94	7810.1	2.84	3.07	3.43	3220.8	3.01	3.12	3.65
7990.6	8020.6	2.46	2.29	2.22	7990.1	2.78	2.92	3.25	3320.5	3.23	3.47	4.13
8150.4	8180.4	2.29	2.23	2.37	8150.1	2.67	2.81	3.08	3400.3	3.48	3.87	4.67
8330.1	8360.1	2.55	2.49	2.47	8330.1	2.43	2.51	2.71	3500.0	3.95	4.54	5.54

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+14	1	23	20	---	---	---	---	---	---
1	-	27	+0	48	12	38	32	---	---	---	---	---
2	86	55	60	47	58	57	70	65	---	---	---	---
3	>90	>72	59	>72	61	>72	65	>72	>72	---	---	---
4	>90	>72	>72	>72	>72	>72	>72	>72	>72	>72	---	---
5	---	---	>72	>72	>72	>72	>72	>72	>72	>72	>72	---
6	---	---	---	>72	>72	>72	>72	>72	>72	>72	>72	>72
7	---	---	---	---	>72	>72	>72	>72	>72	>72	>72	>72
8	---	---	---	---	---	>72	>72	>72	>72	>72	>72	>72
9	---	---	---	---	---	---	>72	>72	>72	>72	>72	>72
10	---	---	---	---	---	---	---	>72	>72	>72	>72	>72
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

Test conditions:

RF IN: 4850 MHz; -12.00 dBm.
LO IN: 4880 MHz; +10.00 dBm
IF OUT: 30 MHz; -17.93 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+4	12	34	31	---	---	---	---	---	---
1	-	27	+0	50	13	39	32	---	---	---	---	---
2	66	50	50	34	49	40	58	52	---	---	---	---
3	>90	48	39	65	38	65	42	62	58	---	---	---
4	>90	72	63	56	71	50	72	61	75	>82	---	---
5	---	---	>82	72	59	80	58	>82	76	>82	>82	---
6	---	---	---	>82	>82	73	>82	68	>82	70	>82	>82
7	---	---	---	---	>82	>82	75	>82	71	>82	76	>82
8	---	---	---	---	---	>82	>82	79	>82	77	>82	>82
9	---	---	---	---	---	---	>82	>82	>82	>82	>82	>82
10	---	---	---	---	---	---	---	>82	>82	>82	>82	>82
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

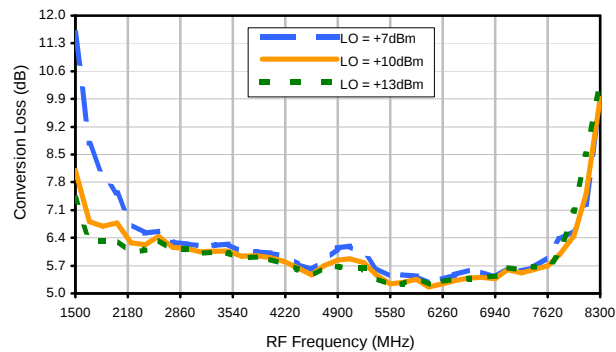
Test conditions:

RF IN: 4850 MHz; -2.00 dBm.
LO IN: 4880 MHz; +10.00 dBm
IF OUT: 30 MHz; -8.08 dBm

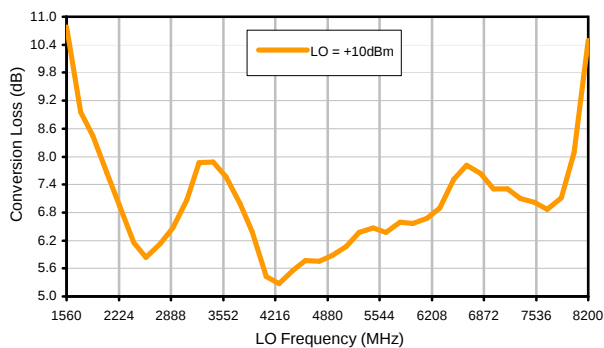
- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

Typical Performance Curves

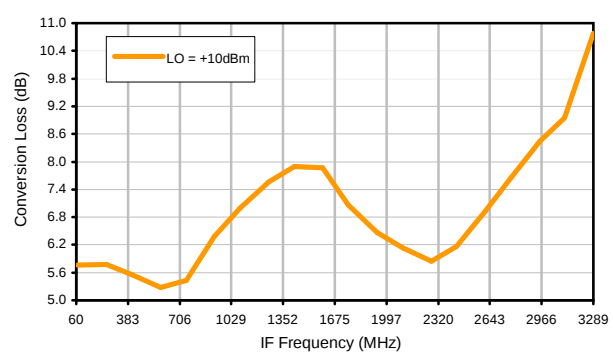
Conversion Loss @ IF=30MHz



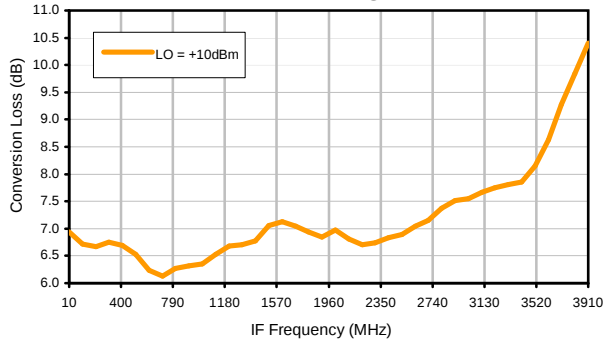
Conversion Loss vs. LO @ RF=4850MHz



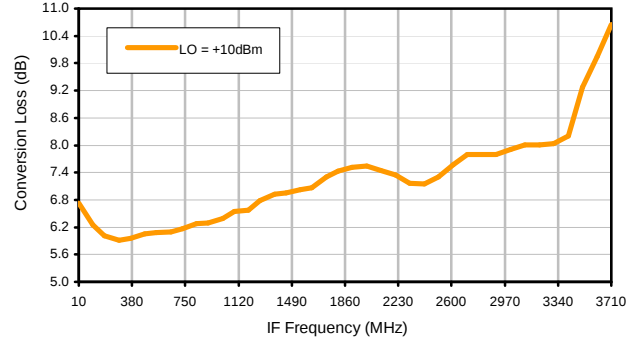
Conversion Loss vs. IF @ RF=4850MHz



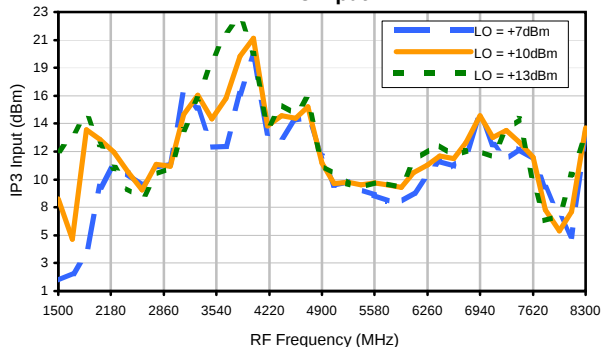
Conversion Loss vs. IF @ RF=1690MHz



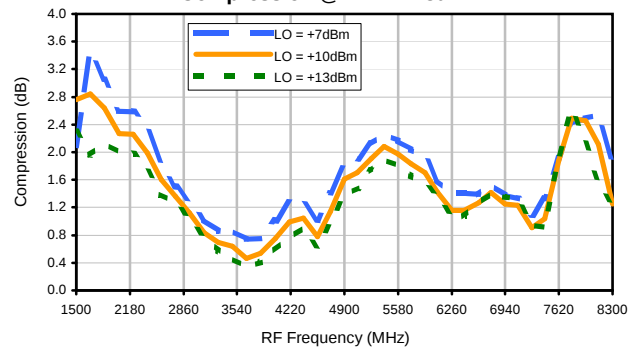
Conversion Loss vs. IF @ RF=8010.1MHz



IP3 Input

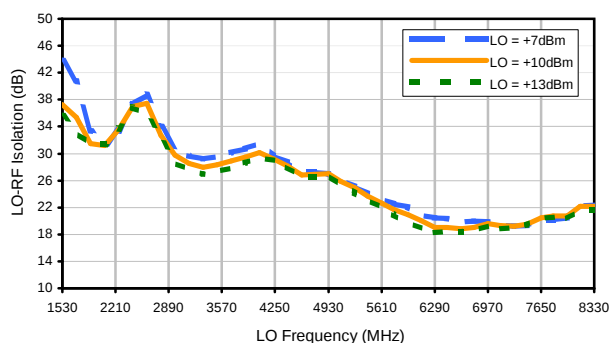


Compression @ RF IN=+3dBm

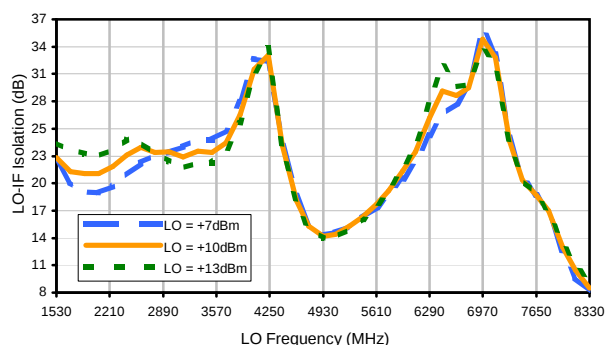


Typical Performance Curves

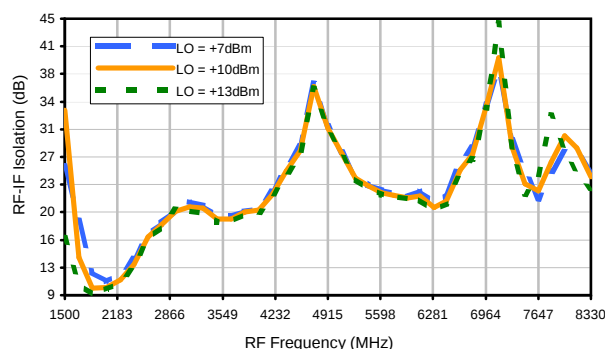
LO-RF Isolation



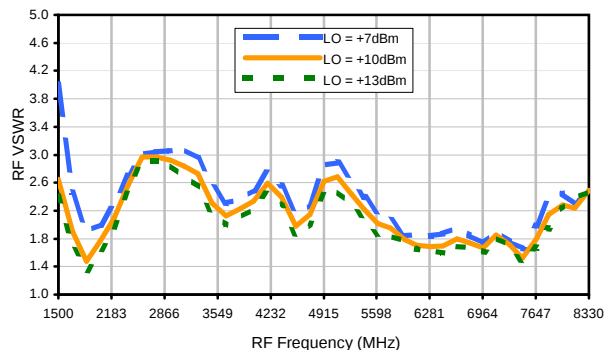
LO-IF Isolation



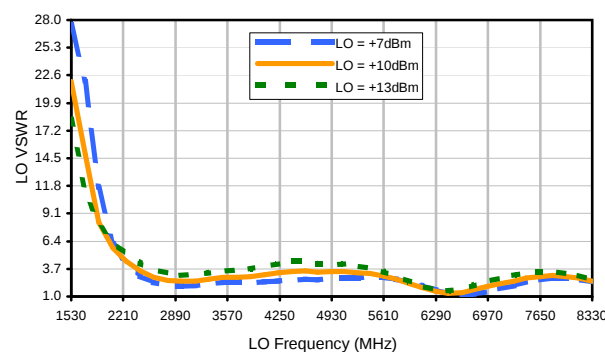
RF-IF Isolation



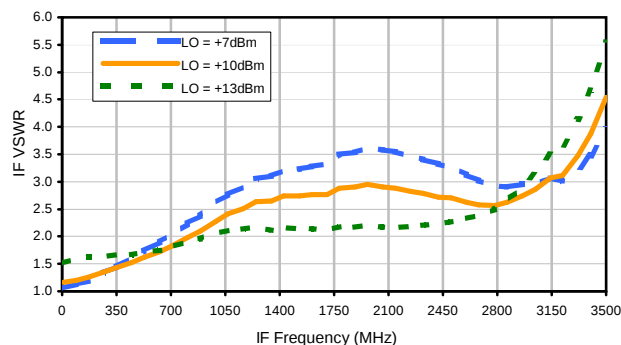
RF VSWR



LO VSWR



IF VSWR



Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+14	1	23	20	---	---	---	---	---	---
1	-	27	+0	48	12	38	32	---	---	---	---	---
2	86	55	60	47	58	57	70	65	---	---	---	---
3	>90	>72	59	>72	61	>72	65	>72	>72	---	---	---
4	>90	>72	>72	>72	>72	>72	>72	>72	>72	>72	---	---
5	---	---	>72	>72	>72	>72	>72	>72	>72	>72	>72	---
6	---	---	---	>72	>72	>72	>72	>72	>72	>72	>72	>72
7	---	---	---	---	>72	>72	>72	>72	>72	>72	>72	>72
8	---	---	---	---	---	>72	>72	>72	>72	>72	>72	>72
9	---	---	---	---	---	---	>72	>72	>72	>72	>72	>72
10	---	---	---	---	---	---	---	>72	>72	>72	>72	>72
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

Test conditions:

RF IN: 4850 MHz; -12.00 dBm.

LO IN: 4880 MHz; +10.00 dBm

IF OUT: 30 MHz; -17.93 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+4	12	34	31	---	---	---	---	---	---
1	-	27	+0	50	13	39	32	---	---	---	---	---
2	66	50	50	34	49	40	58	52	---	---	---	---
3	>90	48	39	65	38	65	42	62	58	---	---	---
4	>90	72	63	56	71	50	72	61	75	>82	---	---
5	---	---	>82	72	59	80	58	>82	76	>82	>82	---
6	---	---	---	>82	>82	73	>82	68	>82	70	>82	>82
7	---	---	---	---	>82	>82	75	>82	71	>82	76	>82
8	---	---	---	---	---	>82	>82	79	>82	77	>82	>82
9	---	---	---	---	---	---	>82	>82	>82	>82	>82	>82
10	---	---	---	---	---	---	---	>82	>82	>82	>82	>82
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 4850 MHz; -2.00 dBm.

LO IN: 4880 MHz; +10.00 dBm

IF OUT: 30 MHz; -8.08 dBm

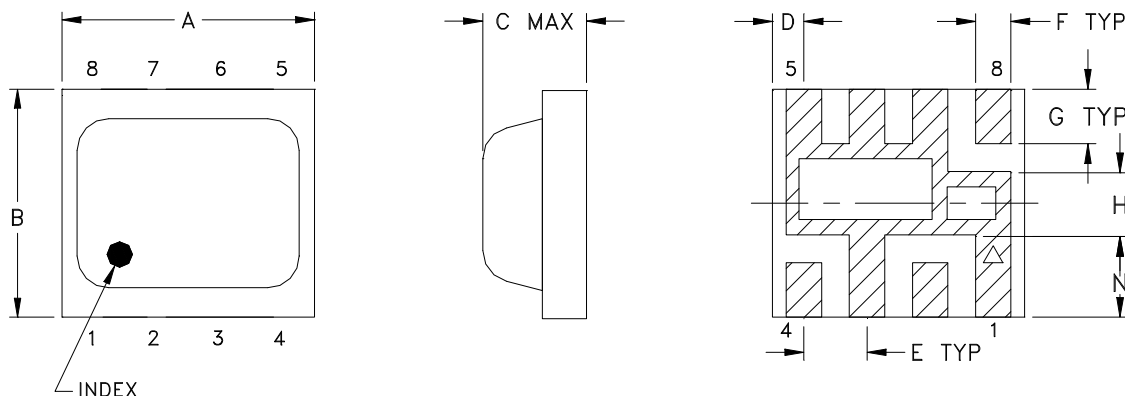
Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.

2. + entry denotes harmonics are in (dBc) above IF OUTPUT.

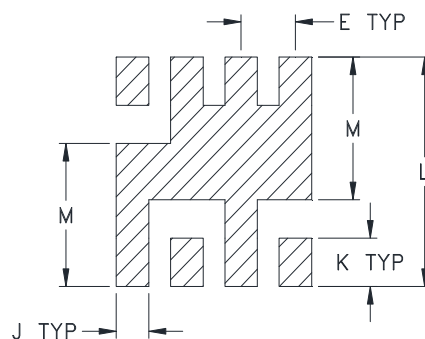
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

Outline Dimensions

HV1195



PCB Metal Land Pattern



Suggested Layout,
Tolerance to be within $\pm.002$

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
HV1195	0.200 (5.08)	0.180 (4.57)	0.087 (2.21)	0.025 (0.64)	0.050 (1.27)	0.028 (0.71)	0.043 (1.09)	0.050 (1.27)	0.030 (0.76)	0.043 (1.09)	0.204 (5.18)	0.127 (3.23)	0.065 (1.65)

CASE#	WT, GRAM
HV1195	.08

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .01$; 3 Pl. $\pm .005$

Notes:

1. Case material: Plastic encapsulation on Ceramic base.
2. Termination finish: Palladium Silver.



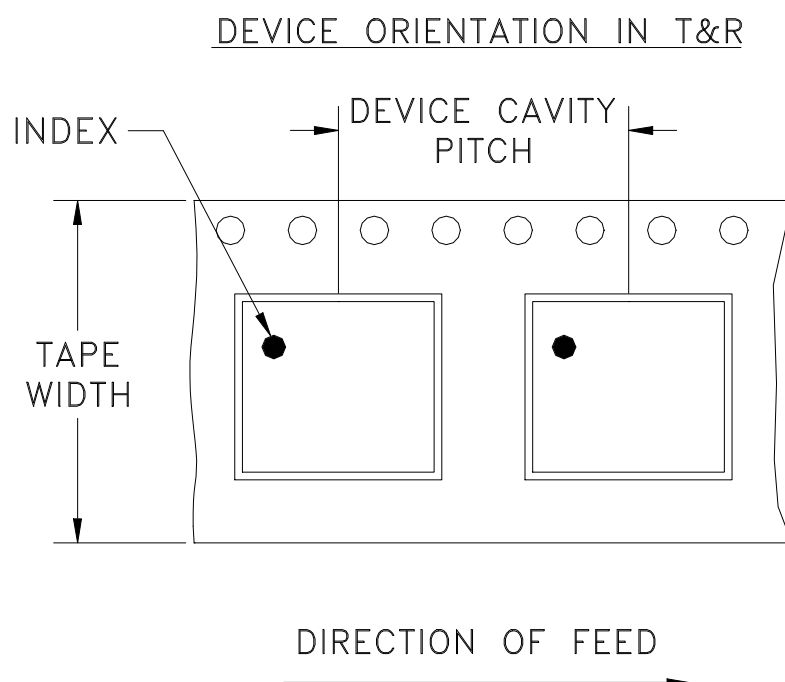
P.O. Box 350186, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F82



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
12	8	7	500

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf



INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

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Mini-Circuits ISO 9001 & ISO 14001 Certified

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M104559	NEW RELEASE	04/11/06	MMG	DJ
A	M109513	MODIFIED SMOBC AREA, REMOVED NOTE 3	01/31/07	PW	DJ
B	M176274	MODIFIED CASE STYLE	09/23/19	ITG	RB

COPLANAR WAVEGUIDE
.038 LINE WIDTH,
.013 GAP, 2 PL.

Ø.013 PTH
FOR GROUND

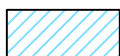
PACKAGE OUTLINE

PIN 1

1. TRACE WIDTH AND GAP ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020"±.0015"; COPPER: 1/2 OZ. EACH SIDE.
FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE _____

DIMENSIONS ARE IN INCHES
TOLERANCES ON:
2 PL DECIMALS ±
3 PL DECIMALS ± .005
ANGLES ±
FRACTIONS ±

DRAWN

MMG

04/10/06

CHECKED

IL

04/11/06

APPROVED

DJ

04/11/06



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, rh, HV1195, SIM, TB-382

SIZE
A

CODE IDENT
15542

DRAWING NO:
98-PL-239

REV:	B
------	---

FILE: 98PL239

SCALE: 10:1

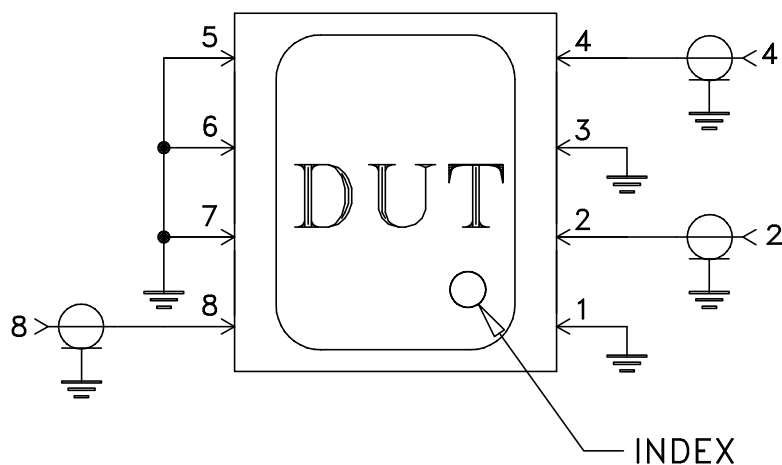
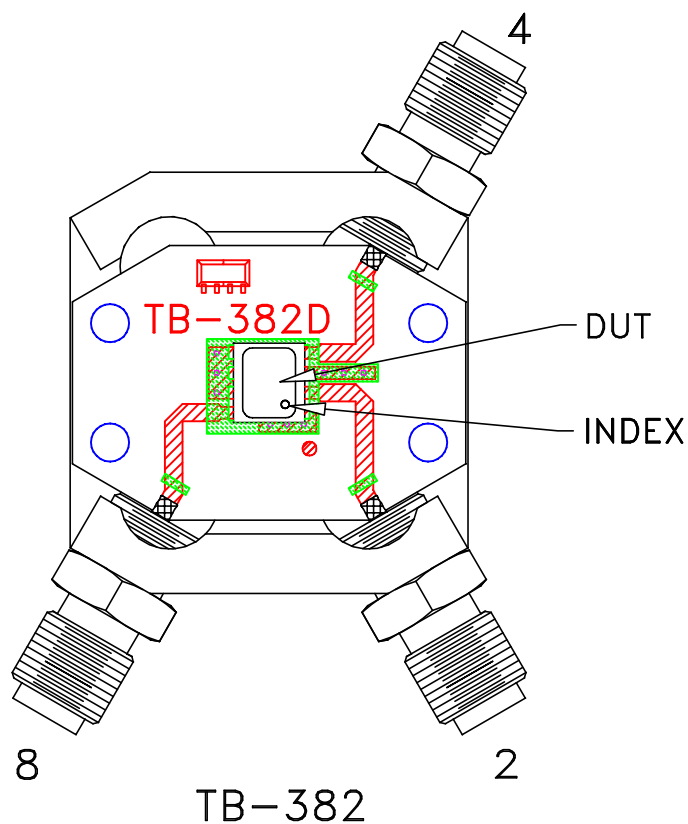
SHEET:	1 OF 1
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ASHEETA1.DWG REV:A DATE:01/12/95

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Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.020 inch.

 **Mini-Circuits®**



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85° C Case Temperature	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102-C, Condition C
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process: 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215